# Health Advisory:

## Novel Influenza A(H3N2)v

**January 6, 2012**

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**Health Advisory**
**January 6, 2012**

**FROM:** **MARGARET T. DONNELLY**
**DIRECTOR**

**SUBJECT:** **Novel Influenza A(H3N2)v**

Novel influenza A viruses that normally circulate in animals may infect humans. These viruses are referred to as "variant influenza viruses" and, as an abbreviation, will be designated with a "v"; examples include A(H3N2)v, A(H1N1)v, and A(H1N2)v.

As of December 23, 2011, the Centers for Disease Control and Prevention (CDC) has received reports of 35 cases of human infection with swine origin variant influenza viruses since 2005. Of these 35 human cases, 13 have been cases of influenza A(H1N1)v viruses, two have been influenza A(H1N2)v viruses, and 20 have been influenza A(H3N2)v viruses. All 35 persons infected with swine viruses recovered from their illness. Twenty-six cases occurred in children aged 18 years or younger, and nine cases occurred in adults. In 25 cases, direct or indirect exposure to swine prior to onset of illness has been identified. Likely transmission of swine-origin influenza virus from close contact with an infected person has been observed in investigations of human infections from swine-origin influenza A virus, but has not resulted in sustained human-to-human transmission. To date, no human cases of any swine origin variant influenza virus infection have been identified in Missouri.

Although human infections with novel viruses typically found in swine are historically rare, CDC states that detections have become more frequent, for which there are three possible reasons: Improvements in laboratory testing for influenza viruses since the 2009 influenza A(H1N1) pandemic may have resulted in identification of viruses that would not have been detected previously; influenza surveillance has increased as the nation enters its winter influenza season; and/or the findings could signal a true increase in the number of cases from infected swine or limited human-to-human exposure.

All reported human cases of influenza A(H3N2)v infection occurred from July 2009 to November 2011. Of these 20 cases, 12 were reported from August 17 to December 23, 2011, and involved infections with influenza A(H3N2)v viruses that have the matrix (M) gene from the pandemic influenza A(H1N1) 2009 virus. The 12 cases occurred in five states (Indiana, Iowa, Maine, Pennsylvania, and West Virginia). Eleven of the 12 patients were children, and 6 of the 12 had no identified recent exposure to swine. Three of the 12 patients were hospitalized, and all have recovered fully. While there is no evidence that sustained human-to-human transmission is occurring, all influenza viruses have the capacity to change, and it is possible that this virus may become widespread.

The influenza A(H3N2)v virus contains genes of human, avian, and swine origin, and is distantly related to human influenza viruses that circulated among people in the 1990s. Adults are likely to have some residual immunity due to this prior circulation while children do not, and thus the latter have accounted for the majority of infections with this virus. The influenza A(H3N2)v virus differs enough from current human seasonal influenza viruses that the seasonal influenza vaccine is expected to provide only limited protection in adults and no protection in young children.

So far, the severity of illnesses associated with influenza A(H3N2)v virus has been similar to the severity of illnesses associated with seasonal influenza virus infections. The duration of influenza A(H3N2)v shedding is unknown, and until more data are available, infected patients should be assumed to be contagious for up to seven days from illness onset.

Influenza A(H3N2)v viruses detected to date are susceptible to oseltamivir and zanamivir. Clinicians who suspect variant influenza virus infection in a patient should consider treatment with these medications if clinically indicated. Because these viruses have the M gene from the pandemic influenza A(H1N1) 2009 virus, they are resistant to amantadine and rimantadine.

Commercially available molecular assays may detect novel influenza A viruses but will not differentiate them from seasonal strains and may give an unsubtypable result, which should be forwarded to the Missouri State Public Health Laboratory (MSPHL) for additional testing. Rapid and immunofluorescence tests have unknown sensitivity and specificity to the influenza A(H3N2)v virus, and negative results from either test do not rule out influenza infections in patients with signs and symptoms that suggest influenza.

**The Missouri Department of Health and Senior Services (DHSS) recommends:**

1. Sentinel providers involved in the U.S. Outpatient Influenza-Like Illness Surveillance Network (ILINet) should double their collection of the required number of respiratory specimens from patients with influenza-like illness (ILI) and continue submission of those specimens to MSPHL for rRT-PCR testing. Priority should be given to testing persons younger than 18 years of age. Interim recommendations for collecting respiratory specimens from patients with suspected influenza A(H3N2)v infections are consistent with those for seasonal influenza.

2. ILI outbreaks, particularly among children in childcare and school settings, should be promptly investigated by public health officials to determine if respiratory specimens should be submitted to MSPHL for testing. At this stage, MSPHL is the only laboratory able to conduct testing to identify novel variant influenza viruses.

3. Upon consultation with public health officials, healthcare providers should consider submitting respiratory specimens to MSPHL from cases with unusual or severe presentations of ILI, especially among children.

4. Confirmed cases of human infection with influenza A(H3N2)v virus should be investigated thoroughly and expeditiously to ascertain whether swine-to-human or human-to-human transmission is ongoing, and to limit further exposures between the case and other persons, and between the case and swine.

5. Since there is no evidence so far that influenza A(H3N2)v transmission characteristics are different from seasonal influenza, CDC and DHSS advise that facilities use the same infection control procedures as for seasonal influenza to help guard against the spread of influenza A(H3N2)v, including the vaccination of healthcare workers.

6. On-going population studies indicate that existing seasonal influenza vaccine can provide limited protection in adults and older children. DHSS recommends continuation of vaccination with seasonal influenza vaccine according to current vaccination guidelines.

CDC has released documents that provide: interim guidance on influenza A(H3N2)v surveillance, specimen collection, and testing; interim case definitions for investigating influenza A(H3N2)v infections; and recommendations for preventing infections with seasonal influenza and influenza A(H3N2)v viruses in healthcare settings. These documents, as well as additional recommendations and guidance, are available at http://www.cdc.gov/flu/swineflu/influenza-variant-viruses.htm.

Comprehensive information on influenza for medical professionals is available at http://health.mo.gov/emergencies/panflu/panmed.php.

Questions should be directed to DHSS' Bureau of Communicable Disease Control and Prevention at 573/751-6113, or 800/392-0272 (24/7).

Updates will be provided as new information becomes available. They can be found at http://health.mo.gov/emergencies/ert/alertsadvisories/.

# Health Advisory:
## Heroin Overdose Deaths in Missouri

**February 21, 2012**

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**Health Advisory**
**February 21, 2012**

**FROM:** **MARGARET T. DONNELLY**
**DIRECTOR**

**SUBJECT:** **Heroin Overdose Deaths in Missouri**

In recent years Missouri has seen a significant increase in the numbers of reported deaths from heroin overdose. This Health Advisory describes the epidemiology of heroin-associated deaths in the state. It provides information on heroin and its effects on the body, and on issues associated with heroin overdose. Recommendations are listed for reducing the occurrence of fatal and non-fatal overdoses with this drug.

### The Epidemiology of Heroin-Associated Deaths in Missouri

Vital statistics data from the Missouri Department of Health and Senior Services (DHSS) indicate that the number of deaths in Missouri residents due to heroin overdose has increased significantly within the last 4 years (from 69 cases in 2007 to 167 in 2009, and 190 in 2010). The provisional number of deaths for 2011 increased further to 244. The St. Louis region is a "hot spot" for heroin-associated death in Missouri: from 2007 to date, 90% of total statewide deaths have been reported from the St. Louis metropolitan area (St Louis City, and the counties of St. Louis, St. Charles, Jefferson, Franklin, and Lincoln). Over 53% of all heroin-associated deaths statewide are between 15 and 35 years of age, while this age group represents only 27% of the population (2009 estimate). The 25-34 year age group is the most affected: 34% of all cases, while it represents only about 13% of the population. There are four times more males than females among heroin victims statewide. For 2007-2009, the African-American death rate was 2.7 per 100,000 population (crude rate), while for Caucasians, the rate was 1.9 per 100,000. In the St. Louis region, the death rate is highest in St Louis City, where it is 5.3 times higher than the state average, followed by Franklin county (2.8 times), St Louis county (2.3 times), and Jefferson county (2.1 times).

### Heroin and It Physiologic Effects

Heroin (diacetylmorphine) is a highly addictive semisynthetic opioid that is derived from morphine. When used intravenously, it is 3-5 times more potent than its parent compound, and is able to modulate pain perception and cause euphoria. In its pure form, heroin is a white powder with a bitter taste. Because of impurities and additives, street heroin may appear in various hues and colors, ranging from white to dark brown, to a black, tarry substance.

The onset of action, peak effects, and duration of action vary with the different methods of use. Patients experience heroin's effect within 1-2 minutes when injected intravenously. Heroin's peak therapeutic and toxic effects are generally reached within 10 minutes when injected intravenously, within 30 minutes when snorted, and within 90 minutes when injected subcutaneously. Analgesic effects generally last 3-5 hours.

Intravenously injected heroin creates a "rush", or a sensation of intense pleasure that begins within one minute of the injection and lasts from one to a few minutes. This "rush" is followed by a period of sedation that lasts about an hour. The half-life of heroin is 15-30 minutes.

**Heroin Overdose**

Heroin poisoning occurs when an individual accidentally or intentionally overdoses on the drug, or when an ingested heroin packet ruptures in the GI tract.

Coma, respiratory depression, and miosis are the hallmarks of opioid overdose. Symptoms generally develop within 10 minutes of intravenous heroin injection. The diagnosis of heroin poisoning should be suspected in all comatose patients, especially in the presence of respiratory depression and miosis. Nonfatal overdose has been associated with pulmonary conditions, muscular complications such as rhabdomyolysis, renal failure, cardiovascular complications, and anoxia-induced cognitive impairment.

The overwhelming majority of overdoses, both fatal and nonfatal, involve the concomitant consumption of heroin with other drugs. The major drugs associated with an increased risk of fatal and nonfatal heroin overdose are alcohol, benzodiazepines, and tricyclic antidepressants. Alcohol is by far the most common concomitant drug. Rates of major depression are extremely high among heroin users, and the risk of suicide is 14 times that of the general population.

Heroin purity appears to have only a moderate relationship to heroin related fatalities. The risk of overdose is substantially less when the drug is smoked rather than injected. Ninety-nine percent of overdose deaths result from the injection of heroin.

The most common scenarios for a significant heroin overdose are the use of a higher dose, the injection of a highly concentrated street sample in the unsuspecting user, or the use of heroin after a prolonged period of abstinence. Intentional, or suicidal, overdoses are rare. The most widely accepted explanation for death due to heroin is the result of a quantity or quality of heroin in excess of the person's current tolerance to the drug.

Usually, males are overrepresented among fatal overdoses. The mean age of overdose fatalities is in the late 20s to early 30s. Contrary to popular misconception, it is not younger, inexperienced heroin users that are at greatest risk of overdose death, rather it is long-term, dependent heroin users who are at greatest risk. After a decade or more of heroin use, many long-term users reduce their use, but they may increase use of other drugs and substances, such as alcohol, to compensate for reduced heroin use. The combination of reduced tolerance and the use of other drugs makes this group more susceptible to overdose. The issue of reduced tolerance is directly relevant to incarcerated heroin users and to heroin users recently released from prison. While many heroin users continue to inject while in prison, such use is typically sporadic, so tolerance to the drug will be substantially reduced; the odds of a fatal overdose occurring in the 2 weeks post-release were 34 times those in times spent outside custody.

Heroin users who overdose are rarely in drug treatment at the time of their deaths. Enrollment in treatment has been demonstrated to substantially reduce the risk of both fatal and nonfatal overdose. Since 1996, an increasing number of community-based overdose prevention programs also provide the opioid antagonist naloxone hydrochloride, the treatment of choice to reverse potentially fatal respiratory depression caused by overdose of heroin. Emerging evidence indicates that providing opioid overdose education and naloxone to persons who use opioid drugs can help reduce overdose mortality. In addition, laypersons who might be present at an opioid overdose (e.g., family members, friends, service providers) can also be provided education, including how to respond to overdoses and how to administer naloxone should an overdose occur. These individuals would also be provided with naloxone which they could administer in an overdose situation.

It has been shown that overdose is strongly related to previous overdose experience. Given that approximately 1 in 20 overdoses result in death, cumulative risk of death increases with each successive overdose. Heroin users experience, on average, a loss of 18 years of potential life, largely due to overdose. About 1-3 % of heroin users die each year, many from heroin overdose. More than half of heroin users experience at least one nonfatal overdose, and 20-40% report an overdose in the past year.

Epidemiological studies also indicate that other people, mostly other drug users, happen to be present in the majority of both fatal and nonfatal overdoses, and that instantaneous death from heroin is uncommon. Most overdose events (66%) occurred in the home, and 85% occurred in the company of others. Thus, there is time for people who are present at the scene to intervene in the majority of heroin overdose deaths. However, responses to overdoses are poor: in the majority of cases, no intervention occurs prior to death. Calling an ambulance is rarely the first action taken, or it happens only after considerable delay, increasing the risk of death or anoxia. The most common reason given for delaying seeking help is the fear of police involvement.

**Recommendations**

- Heroin overdose is a preventable cause of death. The evidence-based interventions to address heroin overdose include treatment, education, and reduction of risk factors.

- State and local agencies should consider partnering with public and private entities to improve the availability of heroin abuse treatment services. Enrollment in heroin abuse treatment programs substantially reduces the risk of both lethal and non-lethal overdose.

- Awareness campaigns educating heroin users about the risks of multiple drug use may help reduce the frequency of heroin overdose.

- Education on the increased risk of overdosing when resuming heroin use after a period of abstinence is essential, especially for older users and those about to be released from prison.

- Heroin users, and their friends and relatives, should be taught simple cardiopulmonary resuscitation skills to keep comatose users alive until help arrives. These groups of people should be encouraged to call an ambulance immediately when overdose occurs. Their understandable fears of police involvement need to be addressed.

**Additional Reference**

CDC. Community-Based Opioid Overdose Prevention Programs Providing Naloxone – United States, 2010. *MMWR* 2012;61(6):101-5.

# Health Advisory:

## Shiga Toxin-Producing *Escherichia coli* (STEC) Cases in Central Missouri

**April 5, 2012**

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**Health Advisory**
**April 5, 2012**

**FROM:** **MARGARET T. DONNELLY**
**DIRECTOR**

**SUBJECT:** **Shiga Toxin-Producing *Escherichia coli* (STEC) Cases in Central Missouri**

The Missouri Department of Health and Senior Services (DHSS) is investigating an increase in cases of Shiga toxin-producing *Escherichia coli* (STEC) in Central Missouri during late March and early April, 2012. Five cases of E. coli O157:H7 have been identified during this time period. Two of the cases, a two-year old child and a seventeen-month old child, reportedly have developed hemolytic uremic syndrome (HUS), a severe, life-threatening condition that may result in permanent kidney damage in some of those who survive.

The investigation is ongoing and the source of the infections has not been identified.

DHSS recommends that any person who has signs or symptoms of STEC infection should seek medical care. Health care providers should determine if testing for STEC infection is warranted.

Symptoms of STEC infection include severe stomach cramps, diarrhea (which is often bloody), and vomiting. If there is fever, it usually is not very high. Most patients' symptoms improve within 5–7 days, but some patients go on to develop HUS, usually about a week after the diarrhea starts. The classic triad of findings in HUS is acute renal damage, microangiopathic hemolytic anemia, and thrombocytopenia.

Use of antibiotics in patients with suspected STEC infections is not recommended until complete diagnostic testing can be performed and STEC infection is ruled out. Some studies have shown that administering antibiotics in patients with STEC infections might increase their risk of developing HUS. However, clinical decision making must be tailored to each individual patient. There may be indications for antibiotics in patients with severe intestinal inflammation if perforation is of concern.

Guidelines to optimize detection and characterization of STEC infections include the following:

- All stools submitted for testing from patients with acute community-acquired diarrhea should be cultured for STEC O157:H7. These stools should be simultaneously assayed for non-O157 STEC with a test that detects the Shiga toxins or the genes encoding these toxins.
- Clinical laboratories should report and send *E. coli* O157:H7 isolates and Shiga toxin-positive samples to the Missouri State Public Health Laboratory (MSPHL) as soon as possible for additional characterization.

- Specimens or enrichment broths in which Shiga toxin or STEC are detected, but from which O157:H7 STEC isolates are not recovered should be forwarded as soon as possible to MSPHL so that non-O157:H7 STEC can be isolated.
- It is often difficult to isolate STEC in stool by the time a patient presents with HUS. Immunomagnetic separation (IMS) has been shown to increase recovery of STEC from HUS patients. For any patient with HUS without a culture-confirmed STEC infection, stool can be sent to the Centers for Disease Control and Prevention (CDC) through MSPHL. In addition, serum can be sent to CDC through MSPHL for serologic testing of common STEC serogroups.

The benefits of adhering to the recommended testing strategy include early diagnosis, improved patient outcome, and detection of all STEC serotypes.

Medical providers are required to report, within one day, suspected or diagnosed cases of the following: Shiga toxin-producing *E. coli* (STEC), other Shiga toxin-positive organisms that have not been characterized, and all cases of post-diarrheal HUS. Reports can be made to the local public health agency, or to DHSS at 800/392-0272 (24/7). In addition, laboratories are required to submit isolates or specimens positive for *E. coli* O157:H7, or for other Shiga toxin-positive organisms, to MSPHL for epidemiological or confirmation purposes.

Laboratory consultation is available from MSPHL by calling 573/751-3334, or 800/392-0272 (24/7). Other questions should be directed to DHSS' Bureau of Communicable Disease Control and Prevention at 573/751-6268, or 800/392-0272 (24/7).

# Health Advisory:
## Illness Associated With Infection by a Novel Phlebovirus in Two Missouri Residents

**June 11, 2012**

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**Health Advisory**
**June 11, 2012**

**FROM:** MARGARET T. DONNELLY
DIRECTOR

**SUBJECT:** 2009 Illness Associated With Infection by a Novel Phlebovirus in Two Missouri Residents

**Phleboviruses are members of the large and diverse *Bunyaviridae* family, with human infections often linked to biting arthropods, including sand flies, mosquitoes, and ticks. In 2009, a previously unknown phlebovirus was identified in Missouri and linked to illnesses in two state residents. The two patients were hospitalized with non-specific febrile illnesses accompanied by leukopenia and thrombocytopenia; both have recovered. Sequencing of viral isolates from these patients indicated the presence of a new phlebovirus.**

**In collaboration with the two medical care facilities where the patients presented and the Centers for Disease Control and Prevention (CDC), the Missouri Department of Health and Senior Services (DHSS) is conducting a public health investigation to learn more about the epidemiological characteristics of this novel pathogen, including possible routes of transmission, and the spectrum of clinical presentation.**

### Background

In 2009, acute blood specimens from two hospitalized Missouri residents were sent to CDC, as part of an ongoing collaboration, for advanced testing for suspected ehrlichiosis (caused by infection with the tick-borne pathogens *Ehrlichia chaffeensis* and *E. ewingii*). Both patients reported multiple tick exposures in the days prior to their illness. Presenting signs and symptoms for these individuals were similar, and consisted of fever, fatigue, anorexia, diarrhea, leukopenia, thrombocytopenia, and slightly elevated transaminases.

The two patients developed more significant thrombocytopenia, as well as moderately elevated transaminases, during hospitalization. Both received treatment with doxycycline for suspected ehrlichiosis, but no significant improvement was noted. Following 10 to 12 days of hospitalization, both patients were released home. One patient completely recovered within a month of his hospitalization. The other patient has returned to his normal activities, but reports fatigue and headaches two years later.

Viral sequences obtained from these patients' specimens showed genetic similarity to a phlebovirus identified in 2011 in China. Human infections with this new Chinese virus can reportedly result in severe fever and thrombocytopenia syndrome (SFTS) [1]. The illnesses in the two Missouri patients were somewhat similar to the SFTS patients, but they were not identical: the Missouri patients lacked the overt bleeding, cerebral hemorrhage, and multi-organ failure described in SFTS patients in China.

Given the fact that the phlebovirus discovered in the two Missouri patients has never been described before, and the small number of cases, caution should be used at this time when making inferences about the clinical spectrum of the infection and its possible sequelae.

Human pathogens of the genus *Phlebovirus* are predominantly transmitted by arthropod vectors. The SFTS virus is believed to be transmitted by ticks; Rift Valley fever virus is transmitted by mosquitoes; and Toscana virus, sand fly virus, Sicilian virus, Punta Toro virus, and others are transmitted by sandflies.[1-3] To better understand the spatial and temporal distribution of potential vectors of the novel Missouri phlebovirus, CDC and DHSS are collecting ticks, mosquitoes, and sand flies in Missouri to screen for the presence of the new virus.

**The DHSS/CDC Epidemiological and Clinical Study**

The DHSS/CDC epidemiological and clinical study is a cooperative project between these agencies and the two Missouri medical care facilities where the phlebovirus patients were seen in 2009. Study activities began in May 2012, and continue throughout the vector transmission season. Study personnel at the two facilities have been trained to collect information on specific clinical signs and symptoms, pre-existing conditions, laboratory results (including complete blood counts), and basic metabolic parameters. The objectives of the study are to:

1. Gather data to further clarify the role of the novel phlebovirus as a human pathogen;
2. Examine possible routes of transmission;
3. Better define the epidemiology and clinical characteristics of the disease; and
4. Prospectively obtain clinical specimens from additional cases for diagnostic assay development.

NOTE: The study methods have been agreed to by the investigators, and establish strict procedures designed to protect potential study participants' rights to informed consent, ensure participants' privacy and confidentiality, and minimize the risk of physical or psychological harm resulting from study activities. In accordance with ethical principles dictated by federal and state laws and regulations, only personnel from the two participating health care facilities who have been trained in the study procedures and protocols are permitted to enroll patients in the study at this time.

**DHSS Comments and Recommendations**

- ***There is no evidence to suggest the novel phlebovirus is a common pathogen.***
    - ✓ Clinicians should adhere to their normal assessment of patient history, signs and symptoms, and physical and laboratory findings to guide their approach in developing a differential diagnosis and treatment plan for any suspected infectious disease.
    - ✓ Health care providers are urged to consider one or more of Missouri's endemic tick-borne rickettsial diseases (e.g., ehrlichiosis, spotted fever rickettsiosis) as a possible diagnosis when evaluating patients with symptoms of fever, headache, myalgia, and findings of leukopenia, thrombocytopenia, mild hyponatremia, or elevated hepatic transaminase levels.
- ***Diagnostics assays for the novel phlebovirus are still under development and are not yet available to medical practitioners or researchers.***

- ***Antiviral therapy for infection with the novel phlebovirus is unknown.***
- ***Transmissibility of this novel phlebovirus is unknown – health care providers should always strictly observe standard precautions, the prevention of needlestick injuries, and appropriate management of clinical specimens.***
- ***Providers are asked to contact their local public health agency or DHSS to report unusual increases in unexplained severe febrile illnesses with thrombocytopenia and leukopenia.***

Note: In addition to the current DHSS/CDC study described here, a previous study was undertaken that more fully describes the two Missouri patients' clinical illnesses, as well as the isolation, electron microscopy, and sequencing methods used to identify the phlebovirus. This study has been submitted for publication.

Questions from the Medical and Health Community should be directed to:

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**References**

1. Yu XJ, Liang MF, Zhang SY, Liu Y, Li JD, Sun YL, et al. Fever with thrombocytopenia associated with a novel bunyavirus in China. *N Engl J Med* 2011;364(16):1523-32.

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**Background Information**

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3. Overturf GD. World arboviruses: the Bunyaviridae. *Pediatr Infect Dis J.* 2009;28(11):1014-5.

# Health Advisory:

## Vibriosis Cases in Eastern Missouri

**June 29, 2012**

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**Health Advisory**
**June 29, 2012**

**FROM:** **MARGARET T. DONNELLY**
**DIRECTOR**

**SUBJECT:** **Vibriosis Cases in Eastern Missouri**

The Missouri Department of Health and Senior Services (DHSS) is investigating a cluster of cases of Vibriosis in eastern Missouri which were identified June 27-28, 2012. Three cases of *Vibrio parahaemolyticus* have been identified during this time period. Typically, this infection is associated with eating raw or undercooked shellfish, particularly oysters. The investigation is ongoing. DHSS recommends that any person who has signs or symptoms of acute gastroenteritis after consuming raw or undercooked shellfish should seek medical care. Health care providers should consider obtaining stool cultures for Vibriosis in such patients.

Vibriosis is caused by *Vibrio* bacteria, such as *Vibrio parahaemolyticus* that grow in coastal waters. Risk factors for acquiring gastrointestinal *Vibrio* infections include: eating raw or undercooked shellfish (oysters, clams, mussels) or crabs; or cross-contamination of other foods and surfaces with raw shellfish or crabs during preparation.

Disease symptoms may include: nausea, vomiting, diarrhea, abdominal cramps, and in some cases, signs of severe infection (septicemia), including fever and low blood pressure.

Symptoms can start from 4 to 96 hours after eating contaminated food. Vibriosis can be a mild to serious disease. People with weakened immune systems – especially those with liver disease, diabetes, and peptic ulcers – are at highest risk for serious disease. The infection is not normally communicable from person to person.

*Vibrio* organisms can be isolated from the stool of patients with gastroenteritis, from blood specimens, and from wound exudates. Because identification of the organism in stool requires special techniques, laboratory personnel should be notified when infection with *Vibrio* species is suspected.

*Vibrio* infections can be treated with antibiotics. Most episodes of diarrhea are mild and self-limited, and do not require treatment other than oral rehydration. Antibiotics are indicated in people with wound infections, severe diarrhea, or septicemia. Septicemia should be treated with a third-generation cephalosporin plus doxycycline. In younger children, trimethoprim-sulfamethoxazole and aminoglycoside is an alternative regimen.

Medical providers are required to report, within three days, suspected or diagnosed cases of Vibriosis. Reports can be made to the local public health agency, or to DHSS at 800/392-0272 (24/7).

Questions should be directed to DHSS' Bureau of Communicable Disease Control and Prevention at 573/751-6268, or 800/392-0272 (24/7).

# Health Advisory:

## Increasing Pertussis Cases in Missouri

**August 2, 2012**

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**Health Advisory**
**August 2, 2012**

**FROM:** **MARGARET T. DONNELLY**
**DIRECTOR**

**SUBJECT:** **Increasing Pertussis Cases in Missouri**

**The Missouri Department of Health and Senior Services (DHSS) has been observing a substantial rise in the numbers of reported pertussis cases in Missouri in recent months. This increase is consistent with the 2012 national pertussis trend. A gradual and sustained increase of this cyclical endemic disease has led to year-to-date case counts in the United States surpassing those from the previous five years for the same period. The national trend of high rates of pertussis among adolescents suggests early waning of immunity from acellular vaccines. Nevertheless, pertussis vaccination remains the single most effective strategy for prevention of infection.**

During the period from week 1 through week 30, 2012, a total of 443 confirmed and probable pertussis cases were reported in Missouri. This number represents a 184% increase over the median number of pertussis cases, for the same time period, during the previous five years in the state. No fatalities have been reported. The increased number of cases corresponds to an incidence rate of 8 cases per 100,000 population, which is double the national rate of about 4 cases per 100,000 population. Most cases are observed in St Louis and Kansas City metro areas. The most significant relative increase has been observed in the Kansas City metro area, which reported 157 cases (131 of those are confirmed cases) of pertussis through week 30 in 2012. For comparison, the number of pertussis cases reported from this area during this period in the previous five years ranged from low of 6 to high of 48. The increase is documented in all age groups from 0 to 65 years of age, but a particularly significant rise is seen in ages 7 through 14 years. In the St Louis metro area, 260 cases (204 of those are confirmed cases) of pertussis were reported through week 30 in 2012. This number corresponds to 145% increase over the median number of pertussis cases, for the same time period, during the previous five years in the St Louis metro area. The most increase is documented in 1 to 6 years, 11 to 14 years, and 15 to 24 years age groups. In those older than 65 years, 5 cases were reported in 2012, compared to 1 to 2 cases in the previous 5 years during the comparable time period. The observed statewide trend is consistent with the national trend of increased incidence among children aged 10, 13, and 14 years. The same trend is also being observed in an on-going pertussis epidemic in Washington State.

Recent changes in the epidemiology of pertussis in the United States are indicative of diminished duration of protection from acellular pertussis vaccine (DTaP) compared to that of whole-cell pertussis (DTwP) vaccine. Whole-cell vaccines, which were replaced in the 1990s by acellular vaccines, are suspensions of entire

killed *Bordetella pertussis* organisms. The incidence of pertussis in the country started to increase in the mid-2000s. It is likely that additional antigens in DTwP vaccines were inducing immune responses with greater durability compared to acellular vaccines containing only several specific antigens. The observed increase in risk by year of life from age 7 to 10 years also suggests a cohort effect of increasing susceptibility as those children, who exclusively received acellular vaccines, continue to age.

In 2006, the Tdap vaccine was recommended for adults and adolescents, beginning at age 11 to 12 years, to boost pertussis immunity. The subsequent relative reduction in the incidence of pertussis among adolescents aged 11 to 12 years was consistent with vaccine effectiveness in the short run, but the increasing numbers of cases in adolescents aged 13 to 14 years suggests immunity wanes after Tdap vaccination in those adolescents fully vaccinated with acellular vaccines during childhood. In recent years, children aged 7 to 10 years have also accounted for a substantial proportion of pertussis cases in the United States. This phenomenon is likely due to waning immunity in children who were fully vaccinated with acellular vaccines.

While Tdap effectiveness in previous studies was 66% to 72% among adolescents who largely received DTwP, the Tdap effectiveness and duration of protection in adolescents fully vaccinated with DTaP is not known.

Because *B. pertussis* is highly transmissible, even vaccinated persons remain susceptible and can become infected during a pertussis outbreak. Analysis of a 2010 California pertussis outbreak showed that unvaccinated children have at least an eightfold greater risk for pertussis than children fully vaccinated with DTaP. Although vaccinated children can develop pertussis, they are less infectious, have milder symptoms and shorter illness duration, and are at reduced risk for severe outcomes, including hospitalization.

Full compliance with current DTaP and Tdap recommendations is needed to prevent infection in all age groups and, especially, to protect infants who are most vulnerable to pertussis.

Since 2005, the Advisory Committee on Immunization Practices (ACIP) has recommended Tdap booster vaccines to unvaccinated postpartum mothers and other family members of newborn infants to protect infants from pertussis, a strategy referred to as cocooning. ACIP has concluded that there is no elevated frequency or an unusual occurrence of adverse events among pregnant women who have received Tdap vaccine, or in their newborns. Tdap vaccine is recommended after 20 weeks gestation because that optimizes antibody transfer and protection at birth, and likely provides protection against pertussis in early life, before the baby starts getting DTaP vaccines. Breastfeeding is not a contraindication for receiving Tdap vaccine. Tdap vaccine can and should be given to women who plan to breastfeed.

Tdap can be administered regardless of the interval since the previous Td dose. Shorter intervals between Tdap and the last Td may increase the risk of mild local reactogenicity, but may be appropriate if your patient is at high risk for contracting pertussis, such as during an outbreak, or if he or she has close contact with infants.

**Missouri DHSS DTaP and Tdap Vaccination Recommendations:**

- Ensure that children are fully vaccinated with **DTaP** as recommended at 2, 4, and 6 months, at 15 through 18 months, and at 4 through 6 years of age.
- Vaccinate with **Tdap** children ages **7 through 10 years** who are not fully vaccinated. Fully vaccinated is defined as 5 doses of DTaP or 4 doses of DTaP if the fourth dose was administered on or after the fourth birthday. Give a single dose of Tdap for those not fully vaccinated, **or** if additional doses of tetanus and diphtheria toxoid-containing vaccines are needed, then children aged 7 through 10 years should be vaccinated according to the catch-up schedule with Tdap preferred as the first dose.
- Provide vaccination with **Tdap** as a single dose for those **11 through 18 years** of age, with preferred administration at 11 through 12 years of age. Minimum age is 10 years for **Boostrix** and 11 years for **Adacel** vaccines.
- **Any adult 19 years of age and older** who has not received a dose of **Tdap** should get one as soon as feasible – to protect themselves and infants. This Tdap booster dose can replace one of the 10-year Td booster doses.
- Give either **Tdap** vaccine product, Adacel or Boostrix, to a person **65 years or older**. Do not miss an opportunity to vaccinate persons aged 65 years and older with Tdap, especially those who may have contact with infants.
- Vaccinate **pregnant women** who have not been previously immunized with **Tdap** with one dose of Tdap during the third trimester or late second trimester. Give Tdap in the immediate postpartum period before discharge from hospital or birthing center for new mothers who were not previously vaccinated or whose vaccination status is unknown.
- Provide DTaP or Tdap (depending on age) vaccination for **all family members and caregivers** of the infant – at least two weeks before coming into close contact with the infant.
- Give a single dose of **Tdap** to **health care personnel** who have not previously received Tdap as an adult and who have direct patient contact. Priority should be given to vaccinating those who have direct contact with babies younger than 12 months of age. Health care personnel include but are not limited to physicians, other primary care providers, nurses, aides, respiratory therapists, radiology technicians, students (e.g., medical, nursing, and pharmaceutical), dentists, social workers, chaplains, volunteers, and dietary and clerical workers.

**References**

CDC. Updated Recommendations for Use of Tetanus Toxoid, Reduced Diphtheria Toxoid and Acellular Pertussis (Tdap) Vaccine from the Advisory Committee on Immunization Practices, 2010. *MMWR* 2011;60(1):13-15

CDC. Immunization of Health-Care Personnel: Recommendations of the Advisory Committee on Immunization Practices (ACIP)**.** *MMWR* 2011;60(RR07):1-45.

CDC. Updated Recommendations for Use of Tetanus Toxoid, Reduced Diphtheria Toxoid and Acellular Pertussis (Tdap) Vaccine in Pregnant Women and Persons Who Have or Anticipate Having Close Contact with an Infant Aged Less than 12 Months — Advisory Committee on Immunization Practices (ACIP), 2011. *MMWR* 2011;60(41):1424-1426.

# Health Advisory:
## Meningitis and Stroke Associated with Potentially Contaminated Product

**October 5, 2012**

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**Health Advisory**
**October 5, 2012**

**FROM:** MARGARET T. DONNELLY
DIRECTOR

**SUBJECT:** Meningitis and Stroke Associated with Potentially Contaminated Product

The Centers for Disease Control and Prevention (CDC) along with public health officials in several states are currently investigating a multi-state outbreak of fungal meningitis among patients who received an epidural steroid injection. **No cases have been reported to date in Missouri**, but medical providers in the state need to be aware of this situation so they can appropriately identify such cases should they occur.

A CDC Health Advisory was issued yesterday (October 4), and is reproduced below. It provides a description of current cases as well as recommendations for medical providers. In Missouri, suspected cases should be reported to the local public health agency, or to the Missouri Department of Health and Senior Services at 800/392-0272 (24/7). Questions should be directed to DHSS' Bureau of Communicable Disease Control and Prevention at 573/751-6113, or 800/392-0272.

This outbreak demonstrates the potential for the occurrence of post-procedural meningitis, and the need, when performing spinal injection procedures, to consistently adhere to basic infection control recommendations including the following:

- Facemasks should always be used when injecting material or inserting a catheter into the epidural or subdural space.
- Use aseptic technique when preparing and administering medications.
- Cleanse the access diaphragms of medication vials with 70% alcohol before inserting a device into the vial.
- NEVER administer medications from the same syringe to multiple patients even if the needle is changed or the injection is administered through intravenous tubing.
- Do not reuse a syringe to enter a medication vial or solution.
- Do not administer medications from a single use or single dose vial to more than one patient.
- Do not use fluid infusion or administration sets (e.g., IV tubing) for more than one patient.
- Dedicate multi-dose vials to a single patient whenever possible. If used for more than one patient, restrict their use to a central medication area. Multi-dose vials should never be taken into the patient treatment area.

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### CDC Health Advisory

Distributed via Health Alert Network, October 4, 2012, 17:05 ET (5:05 PM ET)

### Meningitis and Stroke Associated with Potentially Contaminated Product

**Summary**

The Centers for Disease Control and Prevention (CDC) and the Food and Drug Administration (FDA) are coordinating a multi-state investigation of fungal meningitis among patients who received an epidural steroid injection. Several of these patients also suffered strokes that are believed to have resulted from their infection. As of October 4, 2012, five deaths

have been reported. Fungal meningitis is not transmitted from person to person. These cases are associated with a potentially contaminated medication. Investigation into the exact source is ongoing; however, interim data show that all infected patients received injection with preservative-free methylprednisolone acetate (80mg/ml) prepared by New England Compounding Center, located in Framingham, MA.

**Background**

On September 21, 2012, CDC was notified by the Tennessee Department of Health of a patient with the onset of meningitis approximately 19 days following epidural steroid injection at a Tennessee ambulatory surgery center (ASC). Initial cultures of cerebrospinal fluid (CSF) and blood were negative; subsequently, *Aspergillus fumigatus* was isolated from CSF by fungal culture. On September 28, investigators identified a case outside of Tennessee, possibly indicating contamination of a widely distributed medication. As of October 4, a total of 35 cases* in the following six states have been identified with a clinical picture consistent with fungal infection: Florida (2 cases), Indiana (1 case), Tennessee (25 cases, including 3 deaths), Maryland (2 cases, including 1 death), North Carolina (1 case), and Virginia (4 cases, including 1 death). Fungus has been identified in specimens obtained from five patients, one of whom also had *Propionobacterium acnes,* of unclear clinical significance, isolated from a post-mortem central nervous system specimen.

Infected patients have presented approximately 1 to 4 weeks following their injection with a variety of symptoms, including fever, new or worsening headache, nausea, and new neurological deficit (consistent with deep brain stroke). Some of these patients' symptoms were very mild in nature. CSF obtained from these patients has typically shown elevated white cell count (with a predominance of neutrophils), low glucose, and elevated protein.

**Recommendations**

On September 25, 2012, the New England Compounding Center located in Framingham, MA voluntarily recalled the following lots of methylprednisolone acetate (PF) 80mg/ml:

- Methylprednisolone Acetate (PF) 80 mg/ml Injection, Lot #05212012@68, BUD 11/17/2012
- Methylprednisolone Acetate (PF) 80 mg/ml Injection, Lot #06292012@26, BUD 12/26/2012
- Methylprednisolone Acetate (PF) 80 mg/ml Injection, Lot #08102012@51, BUD 2/6/2013

On October 3, 2012, the compounding center ceased all production and initiated recall of all methylprednisolone acetate and other drug products prepared for intrathecal administration.

Physicians should contact patients who have had an injection (e.g., spinal, joint) using any of the three lots of methylprednisolone acetate listed above to determine if they are having any symptoms. Although all cases detected to date occurred after injections with products from these three lots, out of an abundance of caution, CDC and FDA recommend that healthcare professionals cease use of **any** product produced by the New England Compounding Center until further information is available.

For patients who received epidural injection and have symptoms of meningitis or basilar stroke, a diagnostic lumbar puncture (LP) should be performed, if not contraindicated. Because presenting symptoms of some patients with meningitis have been mild and not classic for meningitis (e.g., new or worsening headache without fever or neck stiffness), physicians should have a low threshold for LP. While CDC is aware of infections occurring only in patients who have received epidural steroid injections, patients who received other types of injection with methylprednisolone acetate from those three lots should also be contacted to assess for signs of infection (e.g., swelling, increasing pain, redness, warmth at the injection site) and should be encouraged to seek evaluation (e.g., arthrocentesis) if such symptoms exist.

For guidance on diagnostic testing that should be performed on patient specimens, physicians can go to www.cdc.gov/hai. State health departments should be informed of patients undergoing evaluation. Clinicians should report any suspected adverse events following use of these products to FDA's MedWatch program at 1-800-332-1088 or www.fda.gov/medwatch.

*Case Definition
1: A person with meningitis[1] of sub-acute onset (1-4 weeks) following epidural injection after July 1, 2012.
2: A person, who has not received a lumbar puncture, with basilar stroke 1-4 weeks following epidural injection after July 1, 2012[2].
3. A person with evidence of spinal osteomyelitis or epidural abscess at the site of an epidural injection diagnosed 1-4 weeks after epidural injection after July 1, 2012.
[1]clinically diagnosed meningitis meaning 1 or more of the following symptoms: headache, fever, stiff neck, or photophobia **and** a CSF profile consistent with meningitis (elevated protein/low glucose/pleocytosis)
[2]These people, if possible, should have an LP.

# Health Advisory:

## FDA Reports Voluntary Recall of All Ameridose Drug Products

**November 1, 2012**

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**Health Advisory**
**November 1, 2012**

**FROM:** **MARGARET T. DONNELLY**
**DIRECTOR**

**SUBJECT:** **FDA Reports Voluntary Recall of All Ameridose Drug Products**

The U.S. Food and Drug Administration (FDA) announced today that Ameridose, LLC, based in Westborough, Mass., is voluntarily recalling all of its unexpired products in circulation. Ameridose is a company sharing common management by the same parties as New England Compounding Center (NECC) of Framingham, Mass., the firm associated with compounded drugs linked to the ongoing fungal meningitis outbreak.

Products from Ameridose can be identified by markings that indicate Ameridose by name or by its company logo. A complete list of all products subject to this recall can be accessed at www.ameridose.com.

**This recall is not based on reports of patients with infections associated with any of Ameridose's products, and the agency recommended this recall out of an abundance of caution. Therefore, at this time, the FDA is also recommending that health care professionals do not need to follow up with patients who received Ameridose products. Health care professionals should stop using Ameridose products at this time, and return them to the firm.**

Hospitals, clinics, health care professionals, and other customers with Ameridose products on hand should immediately examine their inventory and quarantine products subject to this recall. The company has stated that if products are found, a form regarding the current status of these products, which is available at http://cdn-ecomm.dreamingcode.com/public/195/documents/Version-20121031131927-Documents-195-1701-1.doc, should be completed and returned to Ameridose by fax at 508-656-6596, or by email at amdservice@ameridose.com. The company then will contact you to arrange for return of all materials. If there are questions about the recall, the company can be contacted at 888-820-0622 on Monday through Friday from 9:00 am to 5:00 pm EST, or by email at amdservice@ameridose.com.

In addition, health care professionals and patients may dial the FDA's Drug Information Line at 855-543-DRUG (3784) and press * to get the most recent information regarding the Ameridose recall and speak directly to a pharmacist.

Background

The FDA is currently conducting an inspection of Ameridose's facility. Although this inspection is ongoing, the FDA's preliminary findings have raised concerns about a lack of sterility assurance for products produced at and distributed by this facility. Use of non-sterile injectable products can represent a serious hazard to

health that could lead to life-threatening injuries. Most products produced at and distributed by this facility are represented by Ameridose to be sterile products. Ameridose entered into a voluntary agreement with the Massachusetts Board of Registration in Pharmacy to cease all pharmacy and manufacturing operations starting on Oct. 10, 2012.

Together with the State of Massachusetts, the FDA commenced the current inspection of the Ameridose facility as part of the agency's ongoing fungal meningitis outbreak investigation. Ameridose is a company sharing common management by the same parties as New England Compounding Center (NECC) of Framingham, Mass., the firm associated with compounded drugs linked to the ongoing fungal meningitis outbreak.

"Because the preliminary results of the FDA's inspection raise concerns about the sterility assurance of Ameridose's products, the FDA is advising health care professionals to stop using all Ameridose products and follow the recall procedures provided by the firm," explained Janet Woodcock, M.D., director of FDA's Center for Drug Evaluation and Research.

The FDA has identified some Ameridose products that currently appear on the critical shortage list. These products were in shortage before the Ameridose recall, but supplies may be further affected as a result of the Ameridose recall. The FDA is working with alternative manufacturers to maintain supplies of these life-saving drugs.

"The agency is taking all steps within its authority to help prevent or alleviate shortage situations and to minimize the impact this recall may have on drug supplies," stated FDA Commissioner Margaret A. Hamburg, M.D.

As new information becomes available, the FDA will issue additional public communications.

The FDA asks health care professionals and consumers to report any adverse reactions to the FDA's MedWatch Program by fax at 800-FDA-0178, by mail at MedWatch, FDA, 5600 Fishers Lane, Rockville, MD 20852-9787, or on the MedWatch website at www.fda.gov/medwatch[4].

**Distribution information for these products is not available at this time. As Missouri distribution can not be ruled out, please check your inventories for these recalled products.**

Sources:

Ameridose Issues Recall of All Products
http://www.fda.gov/Safety/Recalls/ucm326349.htm

FDA reports voluntary recall of all Ameridose drug products
http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm326361.htm

# Health Advisory:
## Health Concerns about Misuse of Pesticides for Bed Bug Control

**November 28, 2012**

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**Health Advisory**
**November 28, 2012**

**FROM:** **MARGARET T. DONNELLY**
**DIRECTOR**

**SUBJECT:** **Health Concerns about Misuse of Pesticides for Bed Bug Control**
***(Missouri-Specific Guidance on Page 6)***

**Public Health Issues**

The Agency for Toxic Substances and Disease Registry (ATSDR) and the Centers for Disease Control and Prevention (CDC) are alerting the public to an emerging national concern regarding misuse of pesticides to treat infestations of bed bugs and other insects indoors. Some pesticides are being applied indoors even though they are approved only for outdoor use. Even pesticides that are approved for indoor use can cause harm if over applied or not used as instructed on the product label.

There has been a dramatic increase in the number of bed bug-related inquiries received by the National Pesticide Information Center (NPIC) over the past several years, with many involving incidents of pesticide exposure, spills, or misapplications.[1] From January 2006-December 2010, NPIC reported 169 calls to their hotline where residents, homeowners, or pesticide applicators sprayed pesticides indoors to treat bedbugs. These cases involved pesticides that were misapplied, not intended for indoor use, or legally banned from use. Of those, 129 resulted in mild or serious health effects (including one death) for persons living in affected residences.[2]

**ATSDR warns that outdoor pesticides should not be used indoors under any circumstances. Homeowners and applicators should always carefully read the product label to make sure that:**

- **it has an EPA registration number**
- **it is intended for indoor use**
- **it is effective against bed bugs (the label should say it is meant to be used to treat your home for bed bugs) and**
- **you know how to properly mix the product (if a concentrate) and where and how to apply it safely within the home.**

Consumers should also be aware of recent cases where licensed and unlicensed pest control applicators illegally sprayed outdoor pesticides indoors to control bed bugs. In some cases, these pesticides were found at levels that harmed or could have harmed people's health. In some cases, residents were relocated until their homes could be decontaminated.

## Background

This issue first came to ATSDR's attention when a misapplication of a chemical to treat a bed bug infestation occurred in a residential building in Ohio. A pest control applicator hired by the building owner sprayed the interior of 2 occupied apartments with a pesticide intended only for outdoor use. These illegal applications were made five times over 72 hours and included spraying of ceilings, floors, and even beds and a crib mattress. The occupants included a family with small children, who displayed health symptoms typical of pesticide poisoning, including headache, nausea, vomiting, diarrhea, dizziness, and muscle tremors. The families were evaluated and treated at a local hospital. The homes were evacuated and families relocated. The families lost furniture, electronics, clothing, linens, toys, and other personal items that were grossly contaminated. A review of this case and other cases of acute illness related to exposure to insecticides used for bed bug control was recently published in Morbidity and Mortality Weekly Report[3].

Even pesticides that are approved for indoor use can cause harm if over applied or not used according to the label directions. Like the incident in Ohio, these situations can also result in the loss of personal items, the need to replace contaminated building materials, and expensive cleanups. For example, a mother with a young family contacted NPIC and reported a number of serious health effects her husband, her children, and she experienced from pesticide exposure. A pest control applicator hired by their landlord had applied multiple pesticides seven times over a five-month period. The infestation was later determined not to be bed bugs. Before moving out of the contaminated home, the family members (ranging in ages from 1-32 years) experienced neurological symptoms (such as headaches, dizziness, nausea, visual disturbances, numbness in the face and limbs, muscle tremors, etc.), abdominal pain, and cardiopulmonary symptoms (chest tightness, heart palpitations, and chest pain). Documented in another call was a mother who contacted NPIC describing her infant who developed vomiting and diarrhea after being placed on a mattress treated with an undiluted indoor insecticide. Other bed bug related calls to NPIC describe similar complaints where the caller or the caller's family members experienced headaches, dizziness, nausea, vomiting, tremors, etc., from indoor pesticides being misapplied (often over applied).

### How might pesticide exposure affect children?

It is particularly dangerous to allow children to reoccupy a home that has had a recent pesticide treatment where surfaces are still wet, or where they can come in direct contact with pesticide dusts. Children can put objects that have pesticide residues on them in their mouths, and generally put their hands in their mouths and touch their faces more often than adults. They also breathe a greater volume of air per body weight than adults. Thus, the behavior and physical characteristics of children can lead to higher exposures than adults.

### Do pesticide products affect the health of animals?

Exposed animals may have the same health effects as people. **Illness in pets after a pest control application is sometimes a first warning that pesticides have been misused or over applied**. Because of their small body weights, exposed pets may show signs of pesticide poisoning quickly. Cats and dogs may be exposed to pesticides when they come in contact with contaminated surfaces such as floors.

## Preventing Exposure to Pesticides

1. **Make sure you are treating the right pest.** Many pests look alike. Before using any pesticides, confirm that your infestation is actually from bed bugs. Some products are specific to an insect, and won't work if used on any other insect. Depending on the lifecycle stage in which they are found, bed bugs can resemble bat bugs, poultry bugs, carpet beetles, and barn swallow bugs. Ticks can also be mistaken for bed bugs. Bed bugs are small parasitic insects. Adult bed bugs are reddish-brown, have flat bodies, are the shape and size of an apple seed, and do not have wings. Signs of bed bugs in your home include bites on the skin resembling a rash, small spots of blood on bed sheets or clothing, brown fecal stains on linens or furniture, staining on ceilings or walls, and finding molts (cast off skins) in the home. For help making sure your pests are bed bugs, you can contact an entomologist (insect expert) at many county extension services. Follow the link below to find your local extension service: http://www.csrees.usda.gov/Extension/index.html

**2. Do not use pesticides indoors if they are intended for outdoor use.** The label on the product will tell you whether it can be used indoors. Using outdoor pesticides indoors can hurt your family's health, contaminate your home, result in the loss of your belongings if they become contaminated, and cost thousands of dollars to clean up your house to make it safe to reoccupy.

**3. Use a pest control expert if you hire someone to treat your home for a pest problem.** Treating bed bugs is very challenging. If you choose to hire someone to treat your home, an experienced pest management professional can help you treat the infestation effectively. A pest management professional should thoroughly inspect your residence, and provide instructions for preparation and cleaning. They should use a combination of practices based on specific information about the pest's life cycle and habitat needs. This includes non-chemical methods along with limited and targeted pesticide use only as needed. In most cases, chemicals alone will not eliminate pests. When hiring a pest management professional, ask about the specific steps they take to treat infestations.

When you hire someone to control bed bugs or any other pest, make sure they are currently licensed and certified to apply pesticides. Ask to see the certification. Ask for the brand name of the pesticide and the name of the product's active ingredient in case you or a member of your family gets sick from exposure to the product. Read the label of the product the pest control applicator is planning to use to make sure it is for indoor use.

Check with your state pesticide agency to find out about certification and training requirements http://aspcro.org/?q=control-officials. They may also be able to help you find a certified pest control applicator in your area.

**4. If you buy over-the-counter pesticide products to apply yourself, be sure**

- the product is in unopened, original pesticide containers
- the containers are labeled, and
- the containers have an EPA registration number.

If you feel you have been overexposed to a pesticide or feel sick after a pesticide has been used in your home, consult your doctor or a poison control center (1-800-222-1222) immediately.

**5. ALWAYS FOLLOW THE INSTRUCTIONS ON THE PRODUCT LABEL.** The label will tell you which bugs the product will kill, how to mix the product, and where and how to apply the product.
Do not apply pesticides repeatedly or in excess of label directions - more is not better and may be unsafe for your family. Do not apply pesticides to beds or furniture unless the label allows it. Not following the label instructions can harm the health of your family, your pets, or you and can result in contamination of your home that can be expensive and time consuming to clean up. Do not use other household chemicals such as kerosene, rubbing alcohol, or bleach for pest control. They can cause negative health effects, fire, or explosions.

## Treating an infestation: Integrated Pest Management (IPM)

### How can bed bugs be treated safely?

Like lice infestations, bed bugs are best treated using a combination of practices, such as inspection, monitoring, reducing clutter, using physical barriers, and carefully applying pesticides if needed. This type of comprehensive pest control strategy is called "integrated pest management" (IPM). This approach includes vigilant activities by homeowners and renters, such as:

- checking luggage and clothes when returning from a trip or buying second hand clothing, mattresses, or furniture;
- thoroughly inspecting infested areas and the surrounding living space;
- reducing clutter where bed bugs can hide;
- installing encasements on box springs, mattresses and pillows, and using interceptors under bed posts and furniture legs;
- aggressively cleaning infested areas and clothing, in conjunction with professional heat/steam or cold treatments of baseboards and other belongings;
- carefully using pesticides approved for indoor use on bed bugs (see http://cfpub.epa.gov/oppref/bedbug/ for a list of EPA-approved pesticides), or hiring pest management professional.

There is no federal certification program for IPM pest control professionals, and some professionals practice IPM without specific certification, but two non-profit organizations do have certification programs. To learn more about their programs or to find a pesticide control applicator in your area, visit http://greenshieldcertified.org/ or http://www.certifiedgreenpro.org/. This information is being provided solely to assist you and is not an endorsement or recommendation by CDC of any pest control individual or company.

**DO NOT USE BLEACH in areas where you have treated your home with a pesticide. Bleach can convert some pesticides to more toxic forms that could result in harmful exposures to your family**. See the following links and for more information on how to effectively treat bed bug infestations:

- Environmental Protection Agency: http://www.epa.gov/bedbugs
- National Pesticide Information Center: http://www.npic.orst.edu/pest/bedbug.html

# Important phone numbers and Web sites

**If you believe you or a family member has become ill from a pesticide exposure:**

Call your local poison control center: 1-800-222-1222, your local hospital emergency room, or the National Pesticide Information Center at 1-800-858-7378. You can also call the Centers for Disease Control and Prevention Information Line at 1-800-CDC-INFO for information about pesticides.

**If you believe your pet has become ill from a pesticide exposure:**

Contact your local veterinarian or call the National Animal Poison Control Center at 1-888-426-4435.

**To report a possible pesticide misuse:**

Contact your state pesticide regulatory agency. You can state specific contact information at: http://www.npic.orst.edu/reg/state_agencies.html

***To learn more about pesticides and bed bugs***

ATSDR ToxFaqs
http://www.atsdr.cdc.gov/substances/index.asp

CDC Parasites Web site
http://www.cdc.gov/parasites/bedbugs/

Environmental Protection Agency Web sites
http://www.epa.gov/bedbugs
http://www.epa.gov/pesticides

National Pesticide Information Center
http://www.npic.orst.edu

# ***Missouri-Specific Guidance****

**Guidance for Missouri Physicians**

- Medical consultation regarding a patient with possible pesticide poisoning or any other poison is available through the **Missouri Poison Center Hotline** at 1-800-222-1222 or 1-314-772-5200 (St. Louis).
- Pesticide toxicology, signs and symptoms of poisoning, and treatment are covered in the fifth edition of *Recognition and Management of Pesticide Poisonings,* edited by Dr. Routt Reigart and Dr. James Roberts. Both English and Spanish versions are available through the EPA's Office of Pesticide Programs: http://www.epa.gov/oppfead1/safety/healthcare/handbook/handbook.htm.
- Public Health Disease Reporting: Pesticide poisoning is a reportable condition in the State of Missouri under the Missouri Code of State Regulations 19 CSR 20-20.020. To report clinical signs, symptoms, outcome, laboratory data, and epidemiological features, fax positive laboratory reports and the **Missouri Disease Case Report (MO 580-0779)** to your local public health agency or to (573) 526-6946. To download the reporting form, go to: http://health.mo.gov/living/healthcondiseases/communicable/communicabledisease/cdmanual/pdf/CD-1.pdf

**Information for Missouri Residents**

- DHSS recommends homeowners hire a commercial applicator who is licensed and certified by the **Missouri Department of Agriculture (MDA)** to evaluate the type of pest and how to safely exterminate them. The MDA maintains an on-line list of Missouri licensed pesticide applicators.
- Anyone suspecting that damage has occurred from a pesticide application can contact the **MDA** at (573) 751-5504 to file a complaint about the possible misuse of a pesticide by any applicator. Complaints about pesticide misuse can also be submitted to MDA via email or mail; the Pesticide Incident Report form is available for download at http://mda.mo.gov/plants/pdf/PesticideIncidentReport.pdf.
- Consumers' concerns about the health effects of pesticides can be directed to the DHSS-Bureau of Environmental Epidemiology at: 573-751-6102 or (toll-free) 866-628-9891.
- Report a bed bug infestation in a Missouri hotel/motel to DHSS at: 573-751-6095.
- Bed bugs are easily confused with other small household insects, including fleas, carpet beetles, spider beetles, and newly hatched cockroaches (nymphs). If you find an insect that might be a bed bug, contact the **University of Missouri Extension Service** insect identification program.

## If you have health concerns regarding the misuse of pesticides for bed bug control, contact the Bureau of Environmental Epidemiology, Missouri Department of Health and Senior Services 573-751-6102 or (toll-free) 866-628-9891.